Chip Express

Packages

Chip Express Corporation

Chip Express®

The ASIC Time-to-Market Solution™

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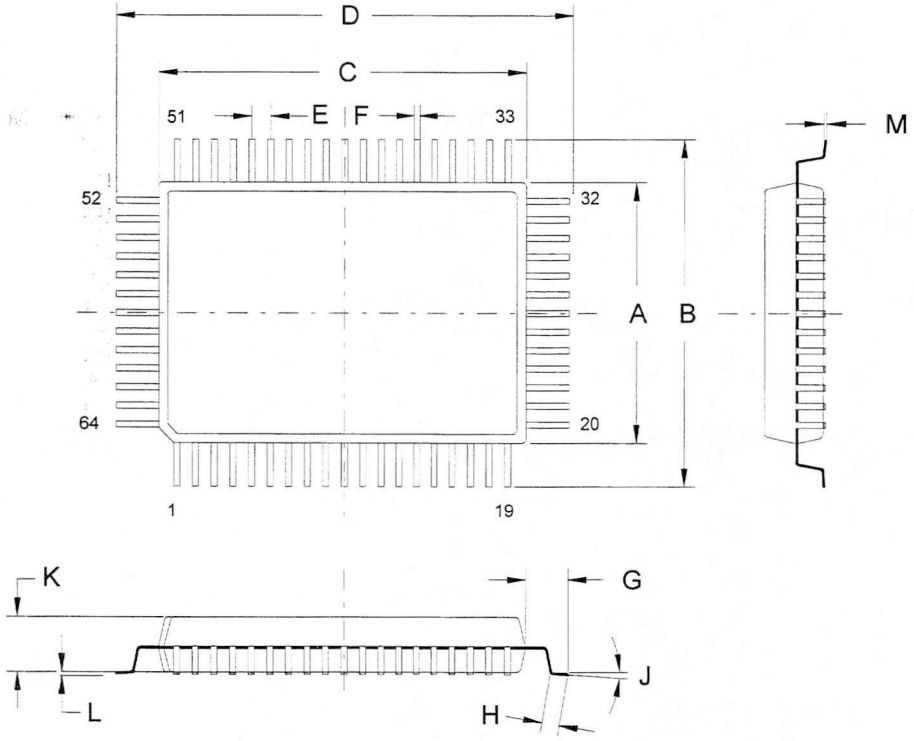
QFP

qfp64

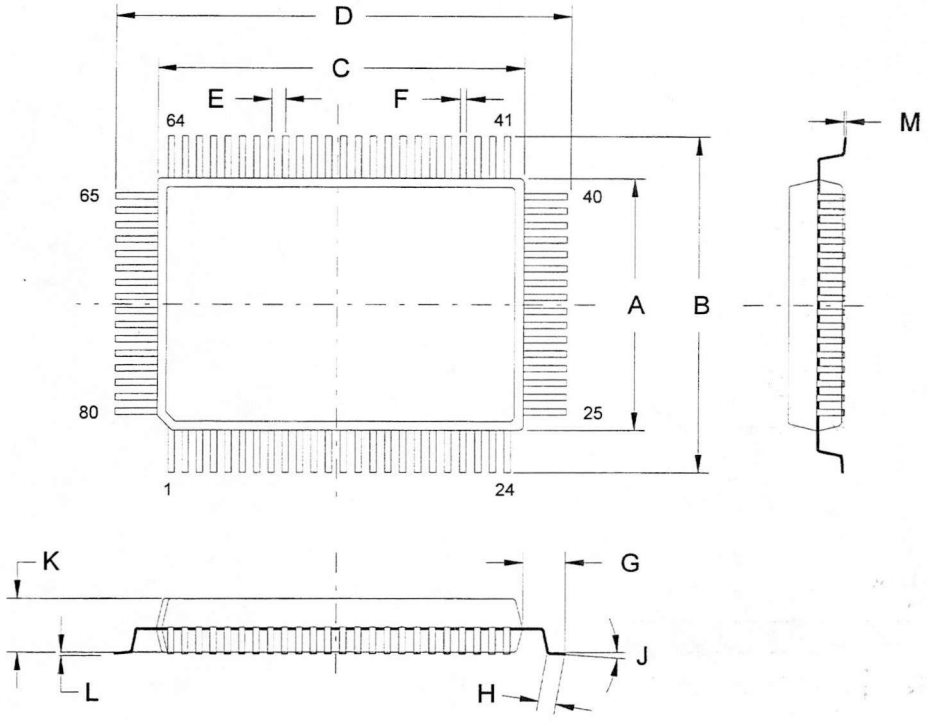
QFP 64



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	14.00±0.14	14.00±0.3	14.00±0.1
B	18.00±.20	18.80±0.4	17.9±0.25
C	20.00±0.18	20.00±0.3	20.00±0.1
D	24.00±0.20	24.80±0.4	23.90±0.25
E	1.00	P-1.00 TYP	1.00
F	0.35	0.35±0.10	0.4±0.10
G	2.00	2.40	1.95
H	0.90	1.20±0.2	.8
J	-10°-0°	-10°-0°	-10°-0°
K	3.00	2.95 MAX	2.72±.15
L	0.15	0.20±0.2	0.25±0.25
M	0.15	0.15±0.0	0.15

qfp80

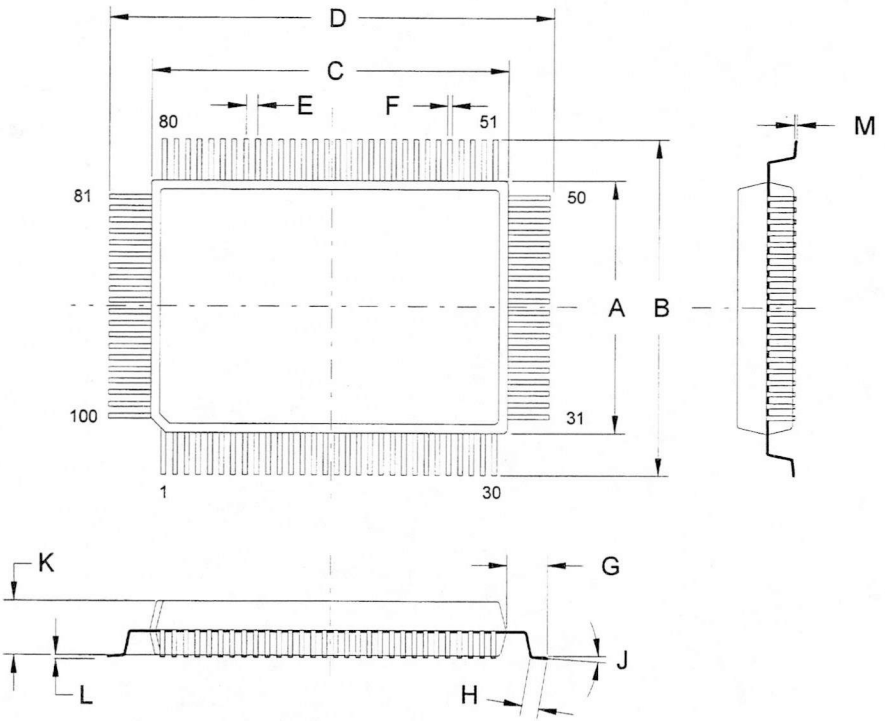
QFP 80



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	14.00±0.14	14.00±0.3	14.00±0.1
B	18.00±0.10	18.80±0.4	17.9±0.25
C	20.00±0.18	20.00±0.3	20.00±0.1
D	24.00±0.10	24.80±0.4	23.9±0.25
E	0.80±0.05	P-0.80 TYP	.8
F	0.35±0.05	0.35±0.10	0.35±0.10
G	2.00±0.05	2.40	1.95
H	0.90	1.20±0.2	.8±.15
J	-10°-0°	0°-15°	-10°-0°
K	3.00	2.95 MAX	2.72±.15
L	0.15	0.20±0.2	0.25±0.25
M	0.15	0.15±0.05	0.15

qfp100

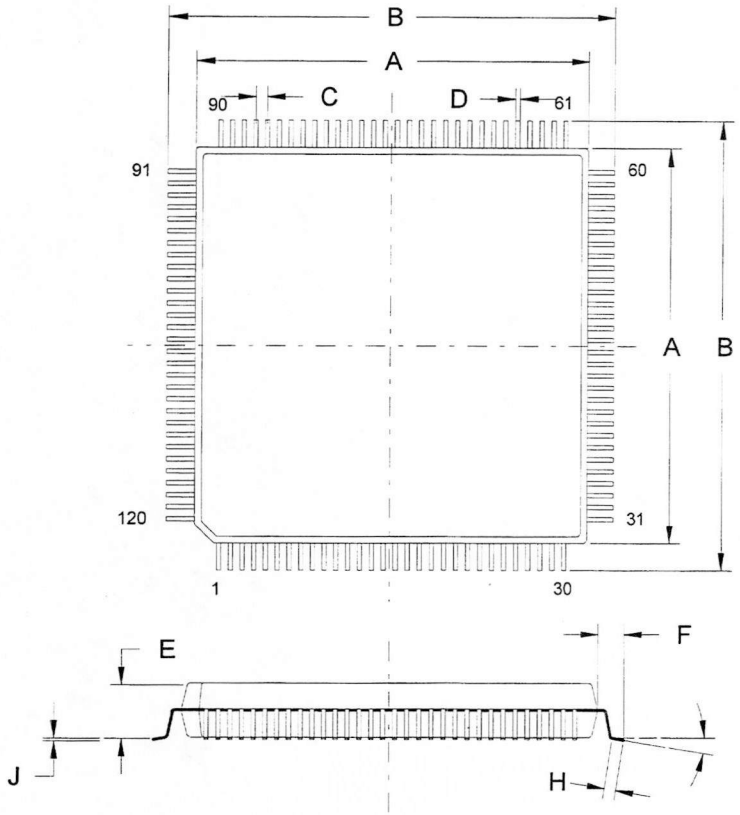
QFP 100



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	14.00±0.14	14.00±0.30	14±0.1
B	18.00±0.10	18.80±0.40	17.9±0.25
C	20.00±0.18	20.00±0.30	20±0.1
D	24.00±0.10	24.80±0.40	23.9±0.25
E	0.65	P-0.65 TYP	.65
F	0.30	0.35±0.10	.3±.1
G	2.00±0.05	2.40	1.95
H	0.90	1.20±0.20	.8±.15
J	-10°-0°	0-15°	-10°-0°
K	3.00	2.95 MAX	2.72±.15
L	0.15	0.20±0.20	.25±.15
M	0.15	0.15±0.05	0.15

qfp120

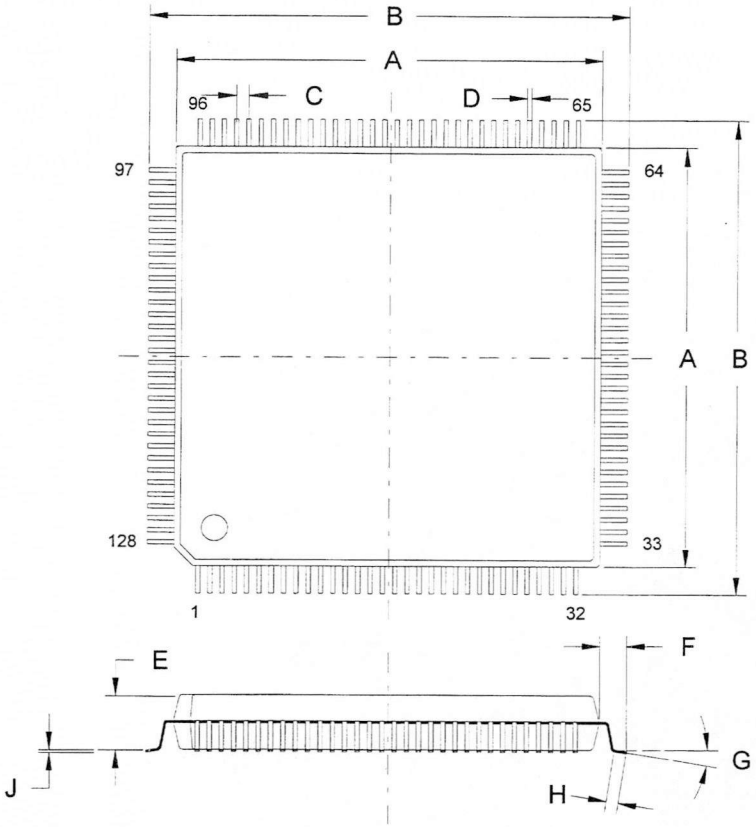
QFP 120



DIM	CERAMIC	ASE/IPAC/PTX
A	28.00±0.28	28±.1
B	32.00±0.20	31.9±.25
C	0.80	.80
D	0.35	0.35
E	3.75	3.32±.15
F	2.00	1.95
G	0-10°	0°-10°
H	0.80±0.20	.8±.15
J	0.15	.15

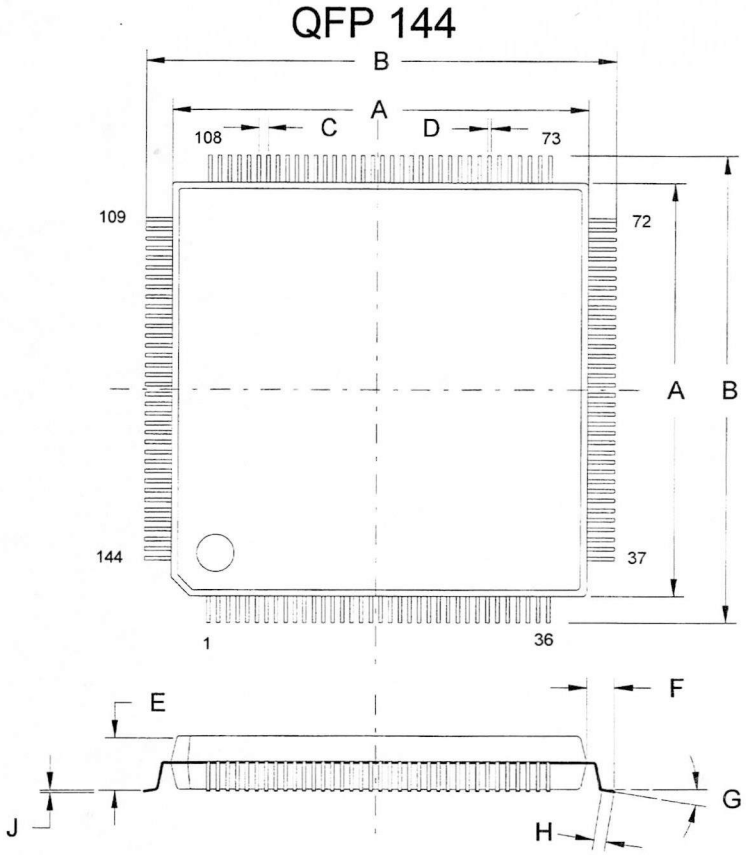
qfp128

QFP 128



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	28.00±0.28	28.00±0.30	28.00±0.1
B	32.00±0.20	31.20±0.50	31.9±0.25
C	0.80±0.31	P-0.80 TYP	.80
D	0.35	0.35±0.10 TYPE OR	.35
		0.38±0.10 TYP	
E	3.75	3.65 MAX	3.32±.15
F	2.00	1.60	1.95
G	0-10°	0-10°	0-10°
H	0.80±0.20	0.80±0.20 TYP OR	.8±.15
		0.70±0.20 TYP	
J	0.15	0.10±0.10 TYP OR	.15
		0.15±0.10 TYP	

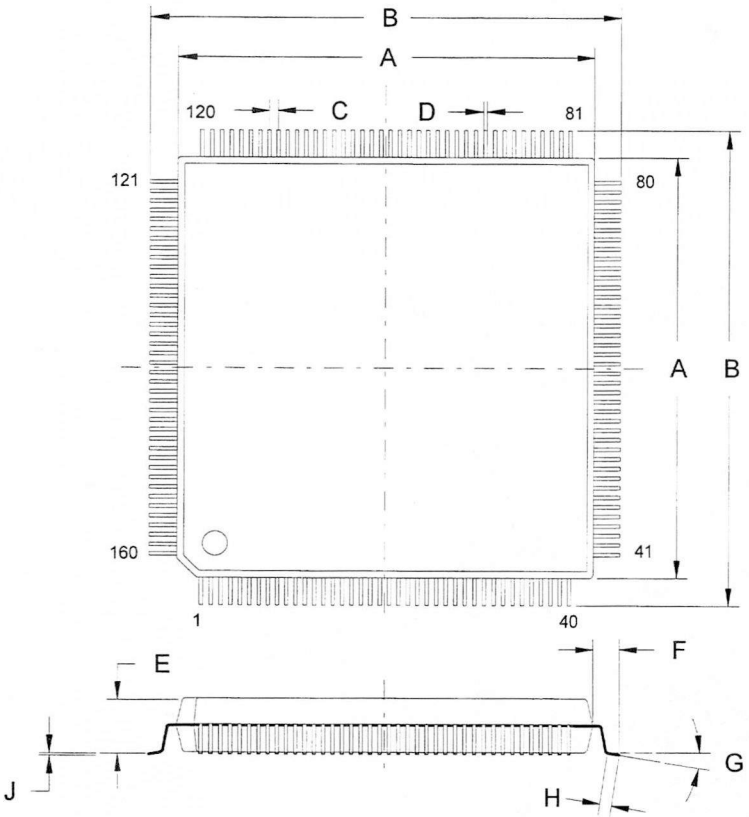
qfp144



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	28.00±0.28	28.00±0.30	28±0.1
B	32.00±0.20	31.20±0.50	31.9±.25
C	0.65	P-0.65 TYP	0.65
D	0.30	0.30±0.10	0.30±0.1
E	3.75	3.65 MAX	3.32±.15
F	2.00	1.60	1.95
G	0-10°	0-10°	0-10°
H	0.80±0.20	0.70±0.20	0.80±0.15
J	0.15	0.10±0.10 TYP OR	0.15
		0.15±0.10 TYP	

qfp160

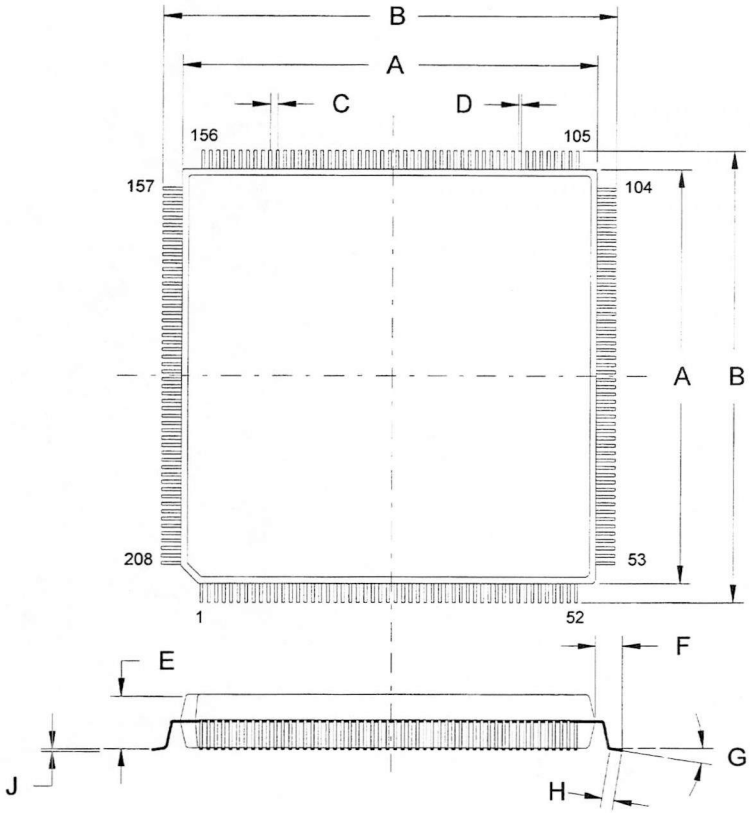
QFP 160



DIM	CERAMIC	YAMAHA	ASE/IPAC/PTX
A	28.00±0.28	28.00±0.30	28.±0.1
B	32.00±0.20	31.20±0.50	31.9±0.25
C	0.65	P-0.65 TYP	0.65
D	0.30	0.30±0.10	0.3±.1
E	3.75	3.65 MAX	3.32±.15
F	2.00	1.60	1.95
G	0-10°	0-10°	0-10°
H	0.80±0.20	0.80±0.20 TYP OR	0.80±0.15
		0.70±0.20 TYP	
J	0.15	0.10±0.10 TYP OR	0.15
		0.15±0.10 TYP	

qfp208

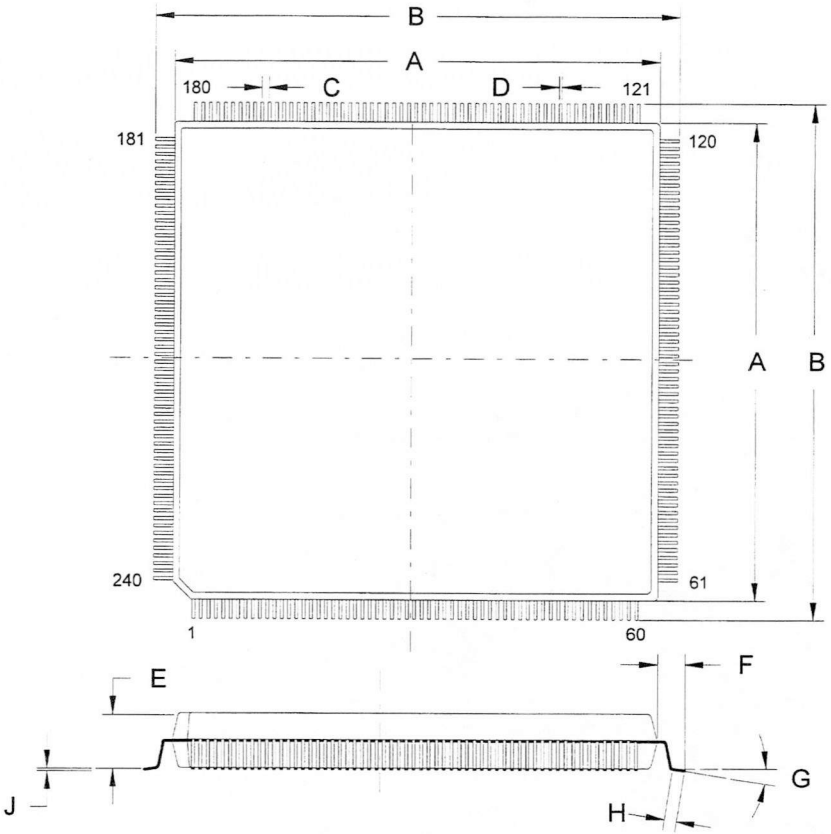
QFP 208



DIM	CERAMIC	YAMAHA	ASE/PTX/IPAC
A	27.2±0.27	28.00±0.30	28.00±0.10
B	30.6±0.20	30.60±0.50	30.60±0.25
C	0.50	P-0.50 TYP	.50
D	0.20	0.20±0.10	0.20±0.10
E	3.75	3.65 MAX	3.32±.15
F	1.7±.1	1.30	1.30
G	0-10°	0-10°	0-10°
H	0.35±.1	0.50±0.20	0.50±0.15
J	0.15	0.10±0.10 TYP OR	0.15
		0.15±0.10 TYP	

qfp240

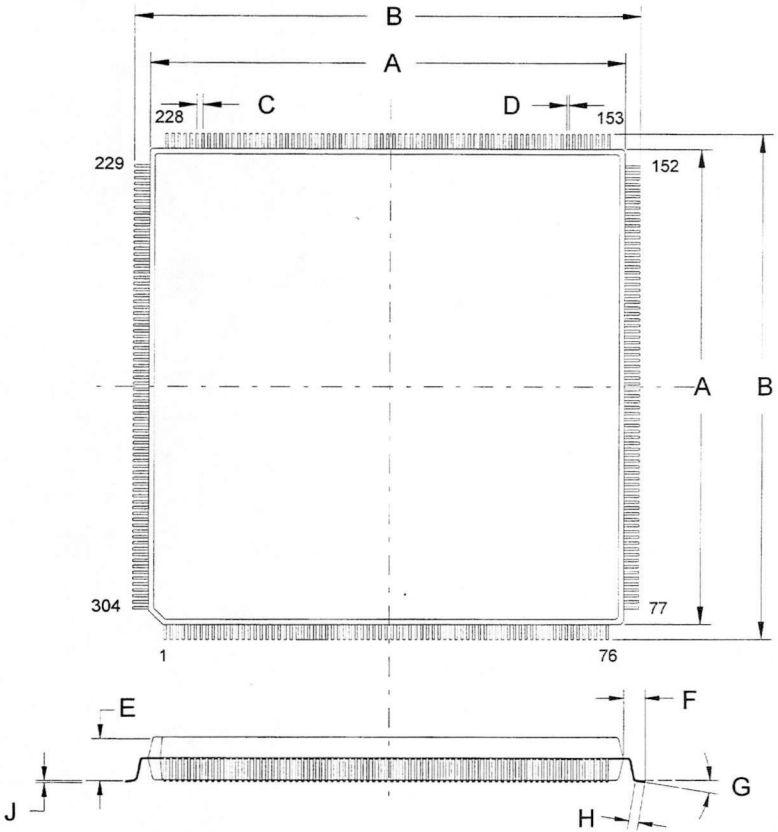
QFP 240



DIM	CERAMIC	ASE/PTX
A	31.20±0.31	32±.1
B	34.50±0.30	34.6±.25
C	0.50	0.50
D	0.20	0.2±.1
E	4.30	3.32±.15
F	1.65	1.30
G	0-10°	0°-10°
H	0.50±0.20	0.50±.15
J	0.15	0.15

qfp304

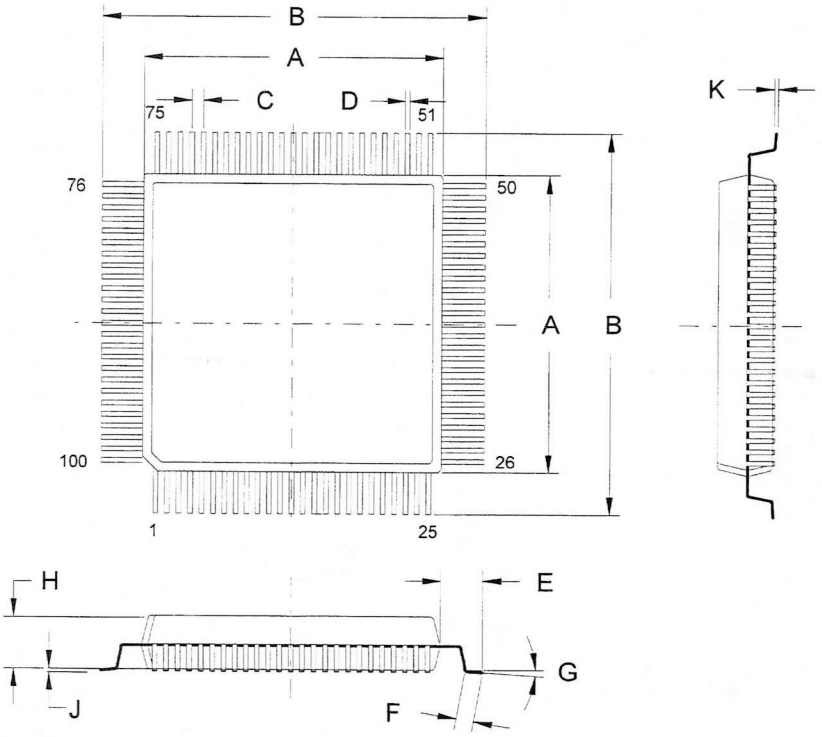
QFP 304



DIM	CERAMIC	ASE
A	39.2±.4	40±.1
B	42.6±.3	42.6±.25
C	0.5	0.5
D	0.2	0.2±.1
E	4.2±.15	3.85±.15
F	1.7	1.30
G	0°-10°	0°-10°
H	0.5±.20	0.50±.15
J	0.15	0.15

sqfp100

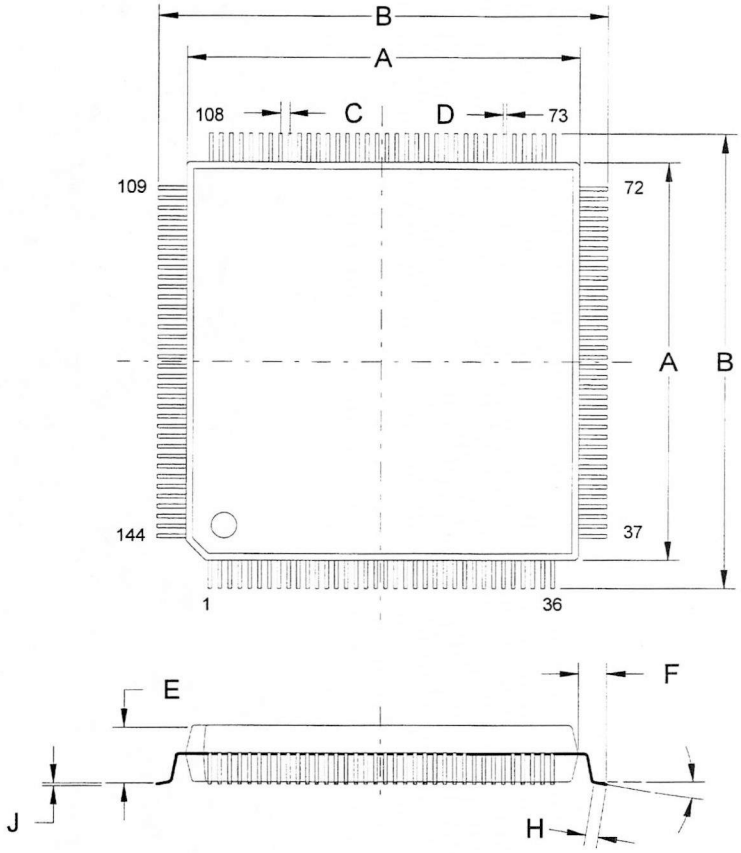
SQFP 100



DIM	CERAMIC	ASE/IPAC
A	13.97±0.15	14±.1
B	16.50±0.15	16±.25
C	0.50	0.50
D	0.20	0.20±.1
E	1.25	1.0
F	0.50±0.15	0.5±.15
G	0-7°	0-7°
H	3.50	1.40
J	0.15	0.1±.1
K	0.15	0.127

sqfp144

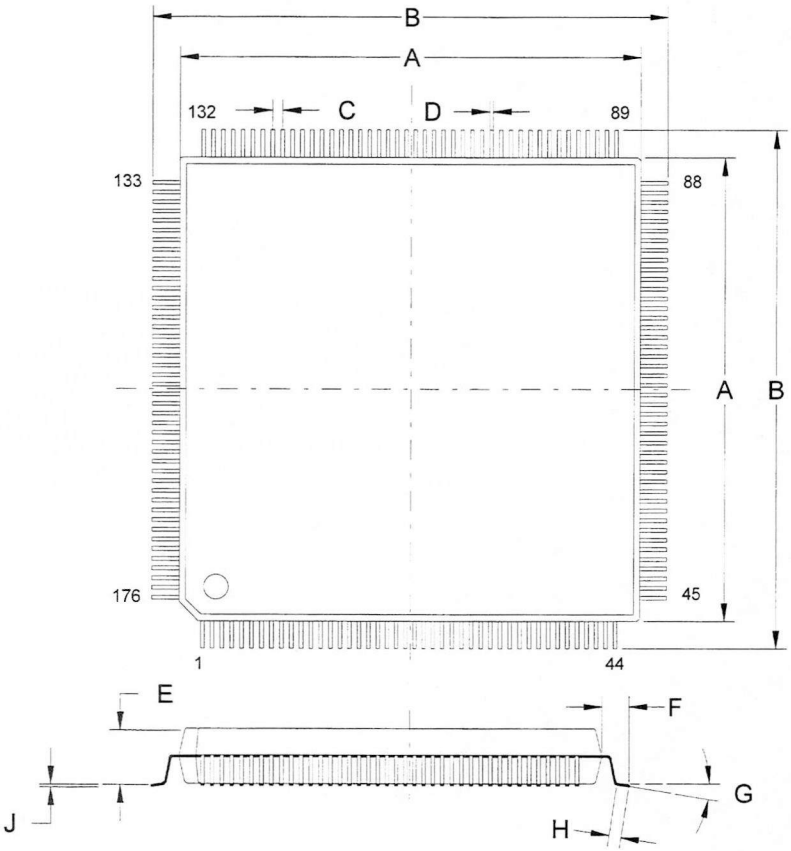
SQFP 144



DIM	CERAMIC	ASE/IPAC
A	19.2±0.19	20±0.1
B	22±.25	22±0.25
C	0.5	0.5
D	0.2	0.2
E	3.8MAX	1.49±.005
F	1.4±0.2	1.0
G	0-10°	0-5°
H	0.5±0.2	0.6±0.1
J	0.15	0.15

sqfp176

SQFP 176

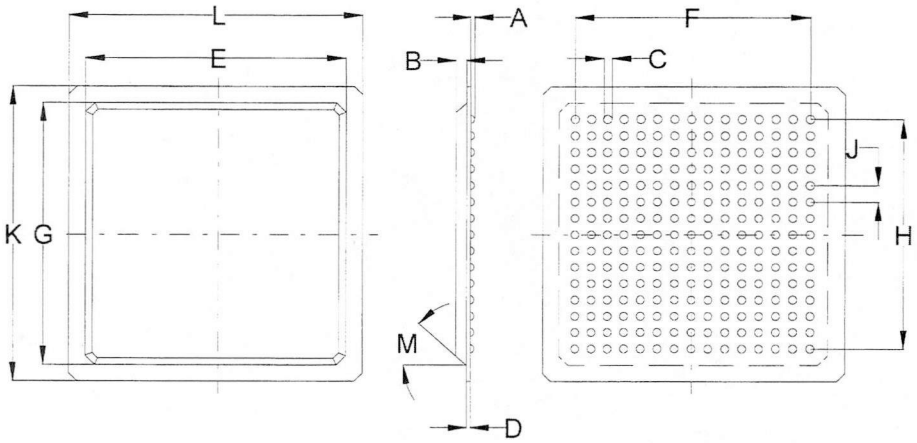


DIM	CERAMIC	ASE/IPAC
A	23.2±.1	24±.1
B	26±.1	26±.25
C	.50	0.5
D	.20	0.2
E	3.8	1.49±.005
F	1.4	1.0
G	0-5°	0-5°
H	.5	.6±.1
J	0.15	0.15

BGA

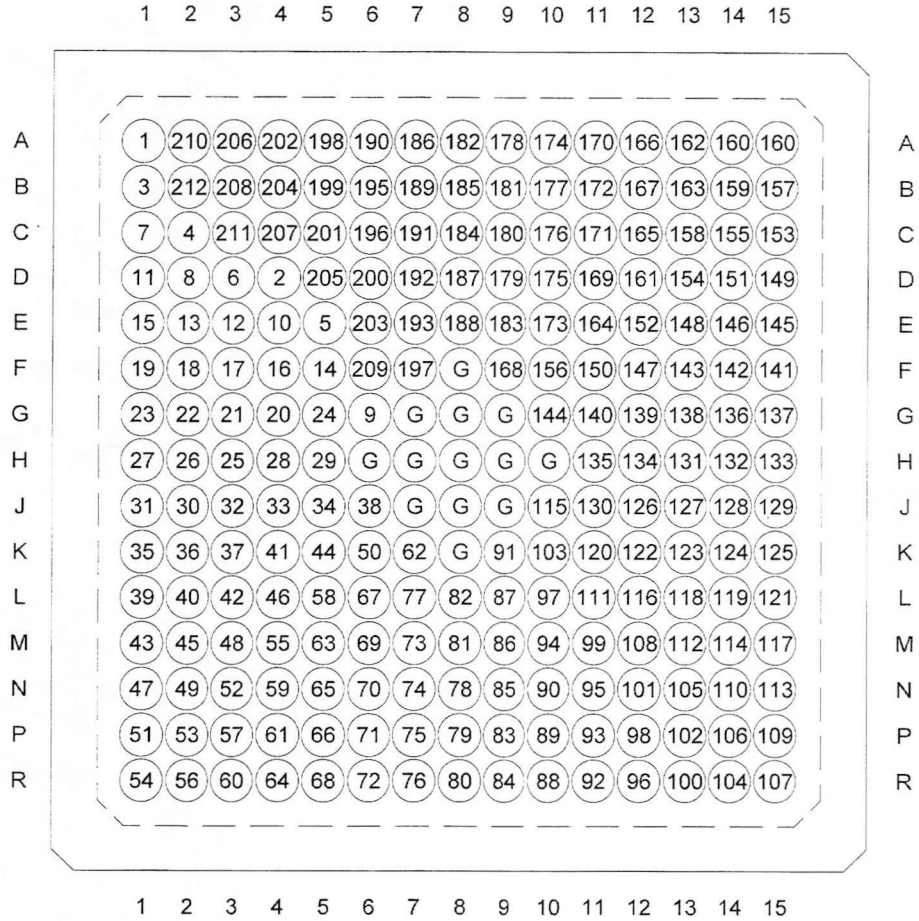
bga225

225LD BGA



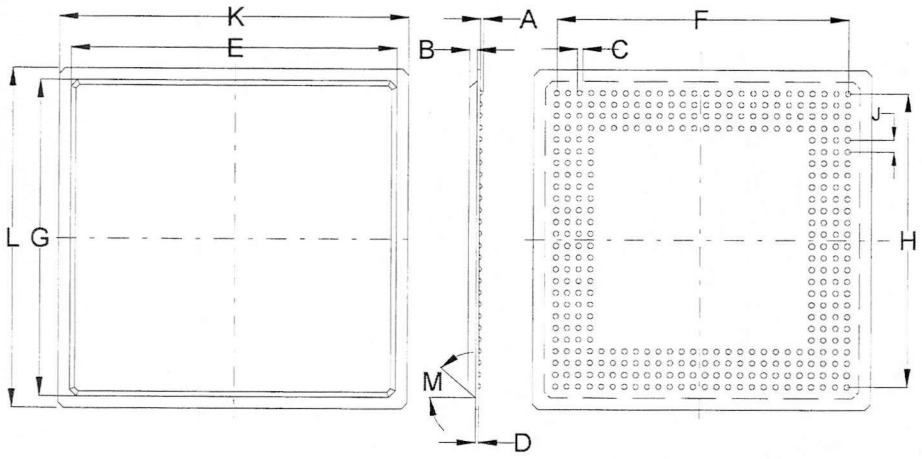
DIM	CHIP EXPRESS
A	.6±.05
B	1.2±.05
C	.75±.15
D	.36±.05
E	24±.20
F	21±.20
G	24±.20
H	21±.20
J	1.5
K	27±.20
L	27±.20
M	25°±2°

BGA 225
PIN ASSIGNMENT (TOP VIEW)



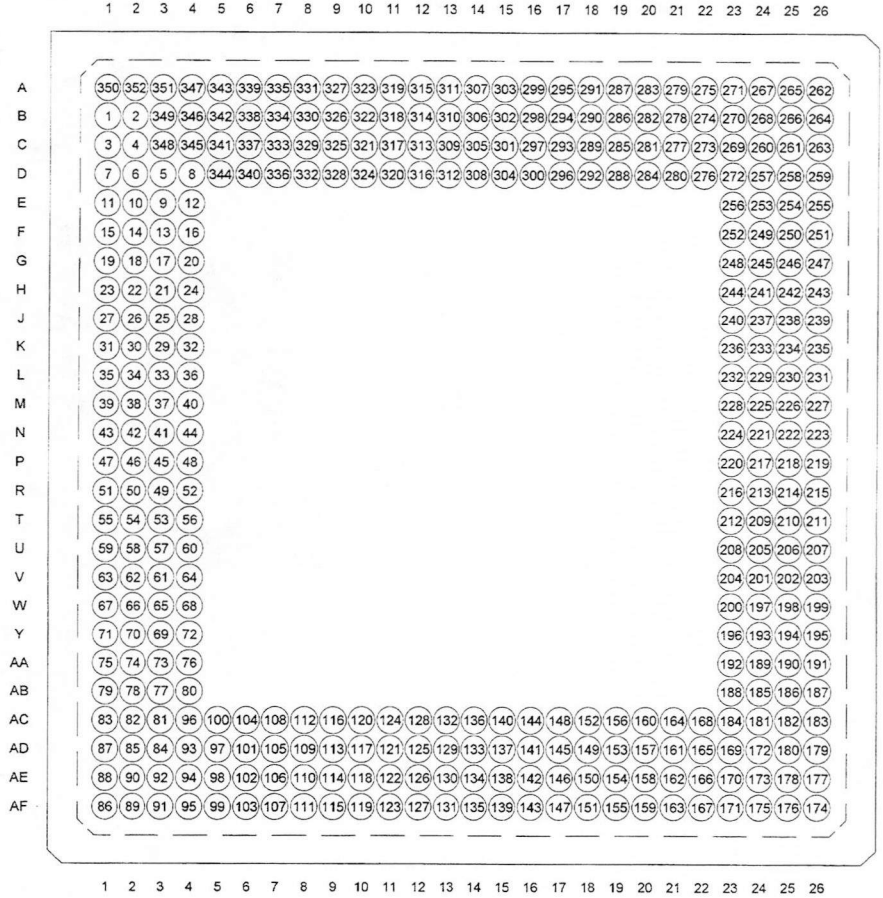
bga352

352LD BGA



DIM	CHIP EXPRESS
A	.6±.05
B	1.17±.05
C	.60±.15
D	.51±.05
E	31.80±.20
F	31.55±.20
G	31.80±.20
H	31.55±.20
J	1.27
K	35.00±.20
L	35.00±.20
M	30°±2°

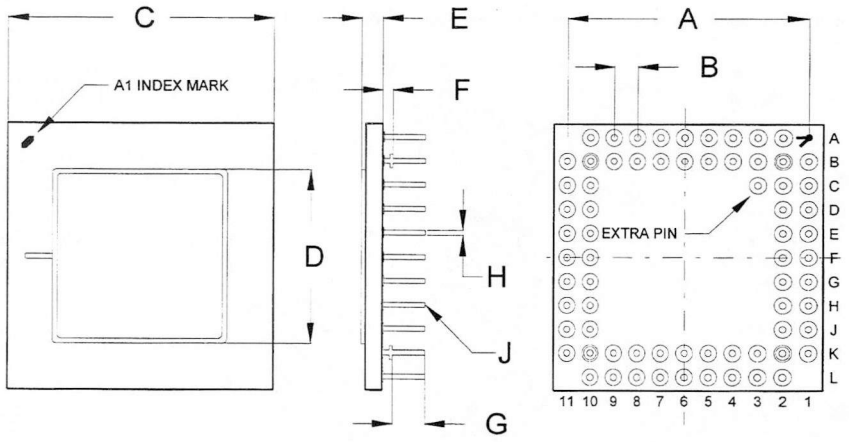
BGA 352LD
PIN ASSIGNMENT (TOP VIEW)



PGA

pga69

69 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	25.40
B	2.54
C	27.89±0.30
D	17.78
E	2.79
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	B2
2	B1
3	C2
4	C1
5	D2
6	D1
7	E2
8	E1
9	F2
10	F1
11	G2
12	G1
13	H2
14	H1
15	J2
16	J1
17	K1
18	K2
19	L2
20	K3

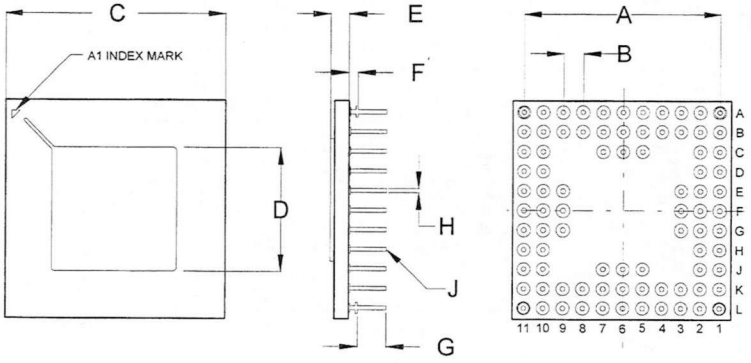
W/B NO.	PIN NO.
21	L3
22	K4
23	L4
24	K5
25	L5
26	K6
27	L6
28	K7
29	L7
30	K8
31	L8
32	K9
33	L9
34	L10
35	K10
36	K11
37	J10
38	J11
39	H10
40	H11

W/B NO.	PIN NO.
41	G10
42	G11
43	F10
44	F11
45	E10
46	E11
47	D10
48	D11
49	C10
50	C11
51	B11
52	B10
53	A10
54	B9
55	A9
56	B8
57	A8
58	B7
59	A7
60	B6

W/B NO.	PIN NO.
61	A6
62	B5
63	A5
64	B4
65	A4
66	B3
67	A3
68	A2

pga84

84 CERAMIC PIN GRID ARRAY



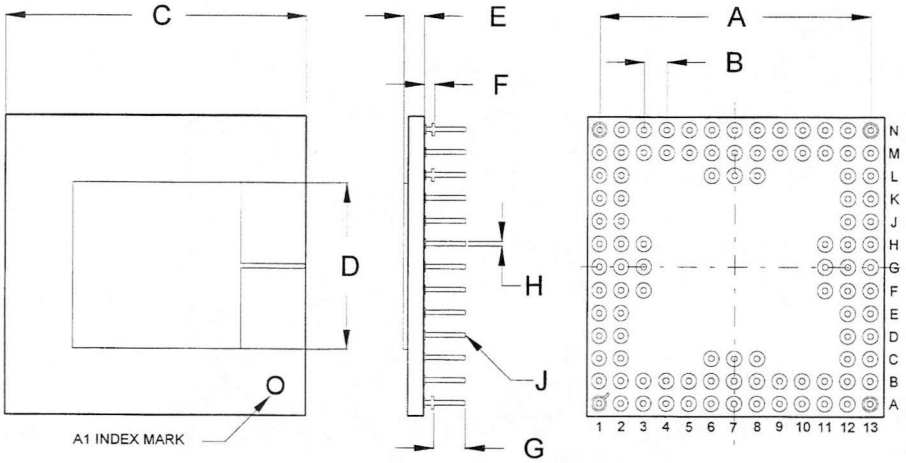
DIM	CHIP EXPRESS
A	25.4
B	2.54
C	27.94±.30
D	18.54±.30
E	2.54
F	1.27±.127
G	3.81
H	1.27
J	.127

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.
1	B2	22	K2	43	K10	64	B10
2	C2	23	K3	44	J10	65	B9
3	B1	24	L2	45	K11	66	A10
4	C1	25	L3	46	J11	67	A9
5	D2	26	K4	47	H10	68	B8
6	D1	27	L4	48	H11	69	A8
7	F2	28	K6	49	G9	70	C7
8	E2	29	K5	50	G10	71	B7
9	E1	30	L5	51	G11	72	A7
10	E3	31	J5	52	F10	73	B6
11	F3	32	J6	53	F9	74	C6
12	F1	33	L6	54	E9	75	C5
13	G1	34	L7	55	E11	76	A5
14	G2	35	K7	56	E10	77	B5
15	G3	36	J7	57	F11	78	A6
16	H1	37	L8	58	D11	79	A4
17	H2	38	K8	59	D10	80	B4
18	J1	39	L9	60	C11	81	A3
19	K1	40	L10	61	B11	82	A2
20	J2	41	K9	62	C10	83	B3
21	L1	42	L11	63	A11	84	A1

pga100

100 CERAMIC PIN GRID ARRAY



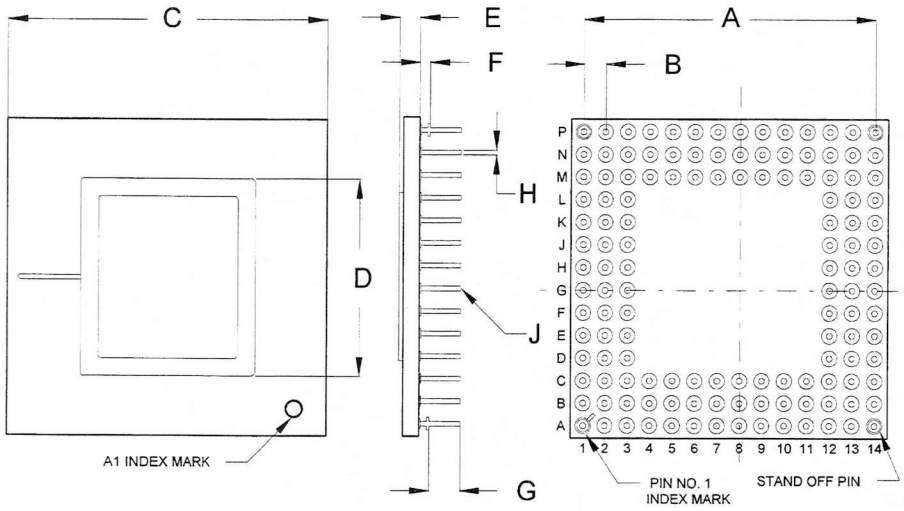
DIM	CHIP EXPRESS
A	30.48±.30
B	2.54
C	33.53±.30
D	17.78
E	2.79
F	1.27
G	3.56
H	.46
J	.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.
1	B2	26	M2	51	M12	76	B12
2	B1	27	N2	52	M13	77	A12
3	C2	28	M3	53	L12	78	B11
4	C1	29	N3	54	L13	79	A11
5	D2	30	M4	55	K12	80	B10
6	D1	31	N4	56	K13	81	A10
7	E2	32	M5	57	J12	82	B9
8	E1	33	N5	58	J13	83	A9
9	F3	34	L6	59	H11	84	C8
10	F2	35	M6	60	H12	85	B8
11	F1	36	N6	61	H13	86	A8
12	G2	37	K7	62	G12	87	B7
13	G3	38	L7	63	G11	88	C7
14	G1	39	N7	64	G13	89	A7
15	H1	40	N8	65	F13	90	A6
16	H2	41	M8	66	F12	91	B6
17	H3	42	L8	67	F11	92	C6
18	J1	43	N9	68	E13	93	A5
19	J2	44	M9	69	E12	94	B5
20	K1	45	N10	70	D13	95	A4
21	K2	46	M10	71	D12	96	B4
22	L1	47	N11	72	C13	97	A3
23	H1	48	N12	73	B13	98	A2
24	L2	49	M11	74	C12	99	B3
25	N1	50	N13	75	A13	100	A1

pga132

132 CERAMIC PIN GRID ARRAY



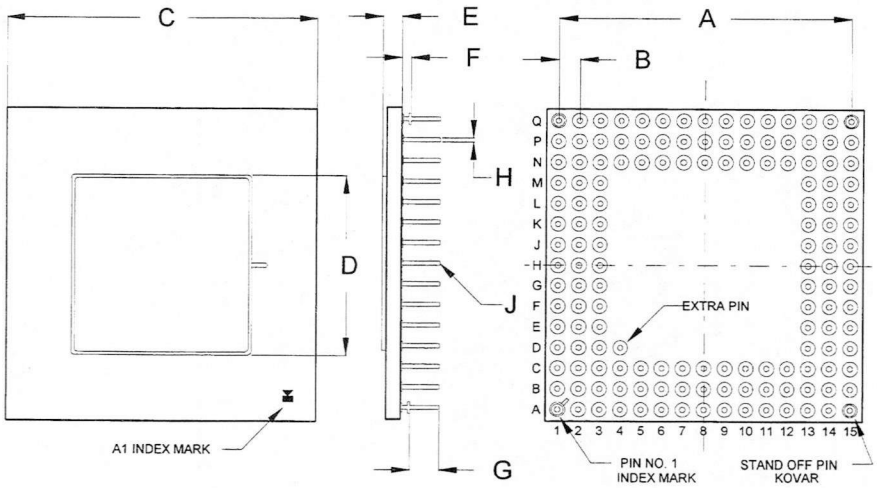
DIM	CHIP EXPRESS
A	33±.3
B	2.54
C	37±.38
D	17.78
E	3.00
F	1.27
G	3.87
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.
1	C3	23	K1	45	N6	67	M12	89	E14	111	B9
2	B1	24	L1	46	P6	68	N14	90	D14	112	A9
3	C2	25	K2	47	P7	69	M13	91	E13	113	A8
4	D3	26	M1	48	N7	70	L12	92	C14	114	B8
5	C1	27	L2	49	M7	71	M14	93	D13	115	C8
6	D2	28	K3	50	M8	72	L13	94	E12	116	C7
7	D1	29	N1	51	N8	73	L14	95	B14	117	B7
8	E3	30	M2	52	P8	74	K12	96	C13	118	A7
9	E2	31	L3	53	P9	75	K13	97	D12	119	A6
10	E1	32	P1	54	N9	76	K14	98	A14	120	B6
11	F3	33	N2	55	M9	77	J12	99	B13	121	C6
12	F2	34	M3	56	P10	78	J13	100	C12	122	A5
13	F1	35	P2	57	P11	79	J14	101	A13	123	A4
14	G1	36	N3	58	N10	80	H14	102	B12	124	B5
15	G2	37	M4	59	P12	81	H13	103	C11	125	A3
16	G3	38	P3	60	N11	82	H12	104	A12	126	B4
17	H3	39	N4	61	M10	83	G12	105	B11	127	C5
18	H2	40	P4	62	P13	84	G13	106	A11	128	A2
19	H1	41	M5	63	N12	85	G14	107	C10	129	B3
20	J1	42	N5	64	M11	86	F14	108	B10	130	C4
21	J2	43	P5	65	P14	87	F13	109	A10	131	A1
22	J3	44	M6	66	N13	88	F12	110	C9	132	B2

pga144

144 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	35.56±.30
B	2.54
C	40.01±0.38
D	19.51
E	2.64
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	D3
2	C2
3	B1
4	D2
5	E3
6	C1
7	E2
8	D1
9	F3
10	F2
11	E1
12	G2
13	G3
14	F1
15	G1
16	H2
17	H1
18	H3
19	J3
20	J1
21	K1

W/B NO.	PIN NO.
22	J2
23	K2
24	K3
25	L1
26	L2
27	M1
28	N1
29	M2
30	L3
31	N2
32	P1
33	M3
34	N3
35	P2
36	Q1
37	N4
38	P3
39	Q2
40	P4
41	N5
42	Q3

W/B NO.	PIN NO.
43	P5
44	Q4
45	N6
46	P6
47	Q5
48	P7
49	N7
50	Q6
51	Q7
52	P8
53	Q8
54	N8
55	N9
56	Q9
57	Q10
58	P9
59	P10
60	N10
61	Q11
62	P11
63	Q12

W/B NO.	PIN NO.
64	Q13
65	P12
66	N11
67	P13
68	Q14
69	N12
70	N13
71	P14
72	Q15
73	M13
74	N14
75	P15
76	M14
77	L13
78	N15
79	L14
80	M15
81	K13
82	K14
83	L15
84	J14

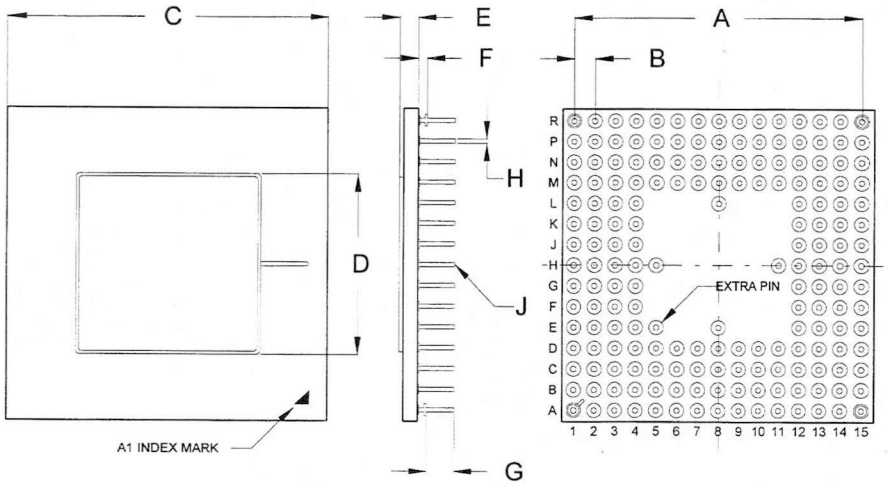
W/B NO.	PIN NO.
85	J13
86	K15
87	J15
88	H14
89	H15
90	H13
91	G13
92	G15
93	F15
94	G14
95	F14
96	F13
97	E15
98	E14
99	D15
100	C15
101	D14
102	E13
103	C14
104	B15
105	D13

W/B NO.	PIN NO.
106	C13
107	B14
108	A15
109	C12
110	B13
111	A14
112	B12
113	C11
114	A13
115	B11
116	A12
117	C10
118	B10
119	A11
120	B9
121	C9
122	A10
123	A9
124	B8
125	A8
126	C8

W/B NO.	PIN NO.
127	C7
128	A7
129	A6
130	B7
131	B6
132	C6
133	A5
134	B5
135	A4
136	A3
137	B4
138	C5
139	B3
140	A2
141	C4
142	C3
143	B2
144	A1

pga180

180 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	35.57
B	2.54
C	40.00
D	20.5
E	3.42
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	B1
2	C1
3	D1
4	E1
5	F1
6	G1
7	H1
8	C2
9	D2
10	E2
11	F2
12	G2
13	H2
14	D3
15	E3
16	F3
17	G3
18	H3
19	E4
20	F4
21	G4
22	H4
23	H5
24	J4
25	K4
26	L4

W/B NO.	PIN NO.
27	M4
28	J3
29	K3
30	L3
31	M3
32	N3
33	J2
34	K2
35	L2
36	M2
37	N2
38	P2
39	J1
40	K1
41	L1
42	M1
43	N1
44	P1
45	R1
46	M5
47	M6
48	M7
49	R2
50	R3
51	R4
52	R5

W/B NO.	PIN NO.
53	R6
54	R7
55	P3
56	P4
57	P5
58	P6
59	P7
60	N4
61	N5
62	N6
63	N7
64	M8
65	M9
66	M10
67	M11
68	L8
69	M12
70	N8
71	N9
72	N10
73	N11
74	N12
75	N13
76	P8
77	P9
78	P10

W/B NO.	PIN NO.
79	P11
80	P12
81	P13
82	P14
83	R8
84	R9
85	R10
86	R11
87	R12
88	R13
89	R14
90	R15
91	P15
92	N15
93	M15
94	L15
95	K15
96	J15
97	H15
98	N14
99	M14
100	L14
101	K14
102	J14
103	H14
104	M13

W/B NO.	PIN NO.
105	L13
106	K13
107	J13
108	H13
109	L12
110	K12
111	J12
112	H12
113	H11
114	G12
115	F12
116	E12
117	D12
118	G13
119	F13
120	E13
121	D13
122	C13
123	G14
124	F14
125	E14
126	D14
127	C14
128	B14
129	G15
130	F15

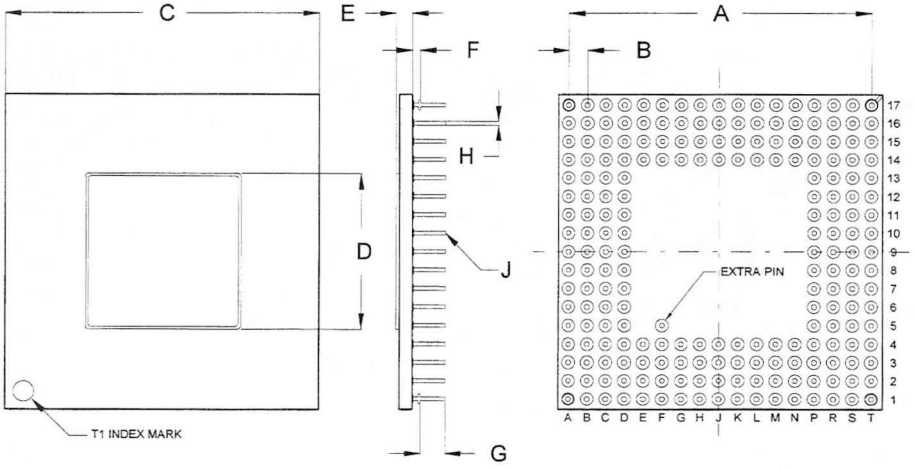
W/B NO.	PIN NO.
131	E15
132	D15
133	C15
134	B15
135	A15
136	D11
137	D10
138	D9
139	A14
140	A13
141	A12
142	A11
143	A10
144	A9
145	B13
146	B12
147	B11
148	B10
149	B9
150	C12
151	C11
152	C10
153	C9
154	D8
155	D7
156	D6

W/B NO.	PIN NO.
157	D5
158	E8
159	D4
160	C8
161	C7
162	C6
163	C5
164	C4
165	C3
166	B8
167	B7
168	B6
169	B5
170	B4
171	B3
172	B2
173	A8
174	A7
175	A6
176	A5
177	A4
178	A3
179	A2
180	A1

S/R	NC
D/A	NC
EXTRA	PINS

pga208

208 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	40.64±.3
B	2.54
C	43.26±.30
D	21.5
E	2.90
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	P4
2	P3
3	R2
4	T1
5	P2
6	N4
7	N3
8	S1
9	R1
10	N2
11	M4
12	M3
13	P1
14	M2
15	N1
16	L4
17	L3
18	M1
19	L2
20	L1
21	K4
22	K3
23	K2
24	K1

W/B NO.	PIN NO.
25	J2
26	J4
27	J3
28	J1
29	H1
30	H2
31	H4
32	H3
33	G1
34	G2
35	F1
36	G3
37	G4
38	E1
39	F2
40	D1
41	F3
42	F4
43	C1
44	E2
45	B1
46	E3
47	D2
48	E4

W/B NO.	PIN NO.
49	C2
50	D3
51	B2
52	C3
53	D4
54	C4
55	B3
56	A1
57	B4
58	D5
59	C5
60	A2
61	A3
62	B5
63	D6
64	C6
65	A4
66	B6
67	A5
68	D7
69	C7
70	A6
71	B7
72	A7

W/B NO.	PIN NO.
73	D8
74	C8
75	B8
76	A8
77	B9
78	D9
79	C9
80	A9
81	A10
82	B10
83	D10
84	C10
85	A11
86	B11
87	A12
88	C11
89	D11
90	A13
91	B12
92	A14
93	C12
94	D12
95	A15
96	B13

W/B NO.	PIN NO.
97	A16
98	C13
99	B14
100	D13
101	B15
102	C14
103	B16
104	C15
105	D14
106	D15
107	C16
108	A17
109	D16
110	E14
111	E15
112	B17
113	C17
114	E16
115	F14
116	F15
117	D17
118	F16
119	E17
120	G14

W/B NO.	PIN NO.
121	G15
122	F17
123	G16
124	G17
125	H14
126	H15
127	H16
128	H17
129	J16
130	J14
131	J15
132	J17
133	K17
134	K16
135	K14
136	K15
137	L17
138	L16
139	M17
140	L15
141	L14
142	N17
143	M16
144	P17

W/B NO.	PIN NO.
145	M15
146	M14
147	R17
148	N16
149	S17
150	N15
151	P16
152	N14
153	R16
154	P15
155	S16
156	R15
157	P14
158	R14
159	S15
160	T17
161	S14
162	P13
163	R13
164	T16
165	T15
166	S13
167	P12
168	R12

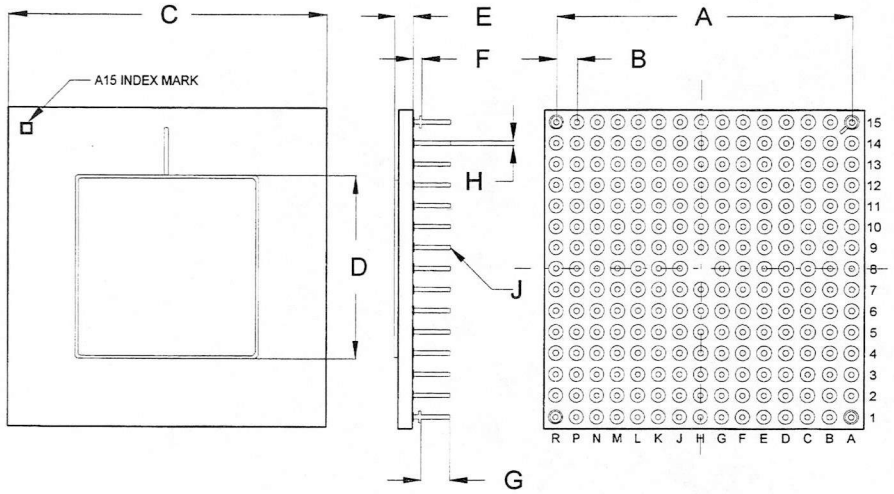
W/B NO.	PIN NO.
169	T14
170	S12
171	T13
172	P11
173	R11
174	T12
175	S11
176	T11
177	P10
178	R10
179	S10
180	T10
181	S9
182	P9
183	R9
184	T9
185	T8
186	S8
187	P8
188	R8
189	T7
190	S7
191	T6
192	R7

W/B NO.	PIN NO.
193	P7
194	T5
195	S6
196	T4
197	R6
198	P6
199	T3
200	S5
201	T2
202	R5
203	S4
204	P5
205	S3
206	R4
207	S2
208	R3

S/R	NC
EXTRA	F5

pga224a

224 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	35.56±.30
B	2.54
C	40.00
D	24.00
E	3.53
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	A15
2	A14
3	A13
4	A12
5	A11
6	A10
7	B14
8	B13
9	B12
10	B11
11	B10
12	C13
13	A9
14	B9
15	A8
16	B8
17	C12
18	C11
19	C10
20	D12
21	D11
22	D10
23	E11
24	E10
25	F10
26	G9

W/B NO.	PIN NO.
27	C9.D/A
28	D9
29	C8
30	D8
31	G8
32	A7
33	A6
34	A5
35	A4
36	A3
37	A2
38	B7
39	B6
40	B5
41	E9
42	F9
43	E8
44	F8
45	B4
46	B3
47	C7
48	C6
49	C5
50	C4
51	D7
52	D6

W/B NO.	PIN NO.
53	D5
54	E7
55	E6
56	F7
57	A1
58	B1
59	C1
60	D1
61	E1
62	F1
63	B2
64	C2
65	D2
66	E2
67	F2
68	C3
69	G1
70	G2
71	H1
72	H2
73	D3
74	E3
75	F3
76	D4
77	E4
78	F4

W/B NO.	PIN NO.
79	E5
80	F5
81	F6
82	G7
83	G3
84	G4
85	H3
86	H4
87	H7
88	J1
89	K1
90	L1
91	M1
92	N1
93	P1
94	J2
95	K2
96	L2
97	G5
98	G6
99	H5
100	H6
101	M2
102	N2
103	J3
104	K3

W/B NO.	PIN NO.
105	L3
106	M3
107	J4
108	K4
109	L4
110	J5
111	K5
112	J6
113	R1
114	R2
115	R3
116	R4
117	R5
118	R6
119	P2
120	P3
121	P4
122	P5
123	P6
124	N3
125	R7
126	P7
127	R8
128	P8
129	N4
130	N5

W/B NO.	PIN NO.
131	N6
132	M4
133	M5
134	M6
135	L5
136	L6
137	K6
138	J7
139	N7
140	M7
141	N8
142	M8
143	J8
144	R9
145	R10
146	R11
147	R12
148	R13
149	R14
150	P9
151	P10
152	P11
153	L7
154	K7
155	L8
156	K8

W/B NO.	PIN NO.
157	P12
158	P13
159	N9
160	N10
161	N11
162	N12
163	M9
164	M10
165	M11
166	L9
167	L10
168	K9
169	R15
170	P15
171	N15
172	M15
173	L15
174	K15
175	P14
176	N14
177	M14
178	L14
179	K14
180	N13
181	J15
182	J14

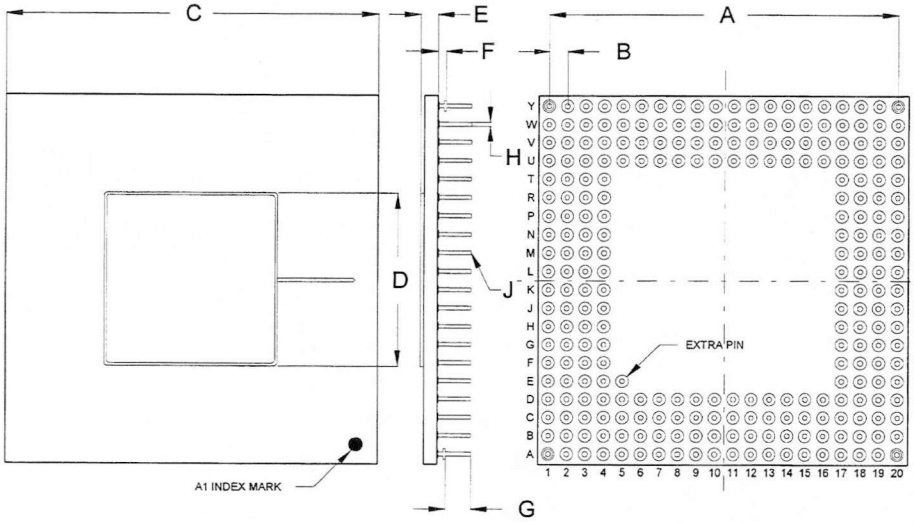
W/B NO.	PIN NO.
183	H15
184	H14
185	M13
186	L13
187	K13
188	M12
189	L12
190	K12
191	L11
192	K11
193	K10
194	J9
195	J13
196	J12
197	H13
198	H12
199	H9
200	G15
201	F15
202	E15
203	D15
204	C15
205	B15
206	G14
207	F14
208	E14

W/B NO.	PIN NO.
209	J11
210	J10
211	H11
212	H10
213	D14
214	C14
215	G13
216	F13
217	E13
218	D13
219	G12
220	F12
221	E12
222	G11
223	F11
224	G10

D/A	C9

pga256

256 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	48.26±.30
B	2.54
C	50.80±.50
D	23.36
E	4.07
F	1.27
G	3.31
H	0.46
J	0.12

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
1	A1
2	D4
3	C2
4	D3
5	B1
6	E4
7	D2
8	E3
9	C1
10	F4
11	E2
12	F3
13	D1
14	G4
15	F2
16	G3
17	E1
18	H4
19	G2
20	H3
21	F1
22	J3
23	H2
24	J4
25	G1
26	J2

W/B NO.	PIN NO.
27	H1
28	K3
29	J1
30	K4
31	K1
32	K2
33	L1
34	L2
35	M1
36	L4
37	N1
38	L3
39	N2
40	M2
41	P1
42	M4
43	P2
44	M3
45	R1
46	N3
47	R2
48	N4
49	T1
50	P3
51	T2
52	R3

W/B NO.	PIN NO.
53	U1
54	P4
55	U2
56	T3
57	V1
58	R4
59	V2
60	U3
61	W1
62	T4
63	W2
64	V3
65	Y1
66	U4
67	W3
68	V4
69	Y2
70	U5
71	W4
72	V5
73	Y3
74	U6
75	W5
76	V6
77	Y4
78	U7

W/B NO.	PIN NO.
79	W6
80	V7
81	Y5
82	U8
83	W7
84	V8
85	Y6
86	V9
87	W8
88	U9
89	Y7
90	W9
91	Y8
92	V10
93	Y9
94	U10
95	Y10
96	W10
97	Y11
98	W11
99	Y12
100	U11
101	Y13
102	V11
103	W13
104	W12

W/B NO.	PIN NO.
105	Y14
106	U12
107	W14
108	V12
109	Y15
110	V13
111	W15
112	U13
113	Y16
114	V14
115	W16
116	V15
117	Y17
118	U14
119	W17
120	V16
121	Y18
122	U15
123	W18
124	V17
125	Y19
126	U16
127	W19
128	V18
129	Y20
130	U17

W/B NO.	PIN NO.
131	V19
132	U18
133	W20
134	T17
135	U19
136	T18
137	V20
138	R17
139	T19
140	R18
141	U20
142	P17
143	R19
144	P18
145	T20
146	N17
147	P19
148	N18
149	R20
150	M18
151	N19
152	M17
153	P20
154	M19
155	N20
156	L18

W/B NO.	PIN NO.
157	M20
158	L17
159	L20
160	L19
161	K20
162	K19
163	J20
164	K17
165	H20
166	K18
167	H19
168	J19
169	G20
170	J17
171	G19
172	J18
173	F20
174	H18
175	F19
176	H17
177	E20
178	G18
179	E19
180	F18
181	D20
182	G17

W/B NO.	PIN NO.
183	D19
184	E18
185	C20
186	F17
187	C19
188	D18
189	B20
190	E17
191	B19
192	C18
193	A20
194	D17
195	B18
196	C17
197	A19
198	D16
199	B17
200	C16
201	A18
202	D15
203	B16
204	C15
205	A17
206	D14
207	B15
208	C14

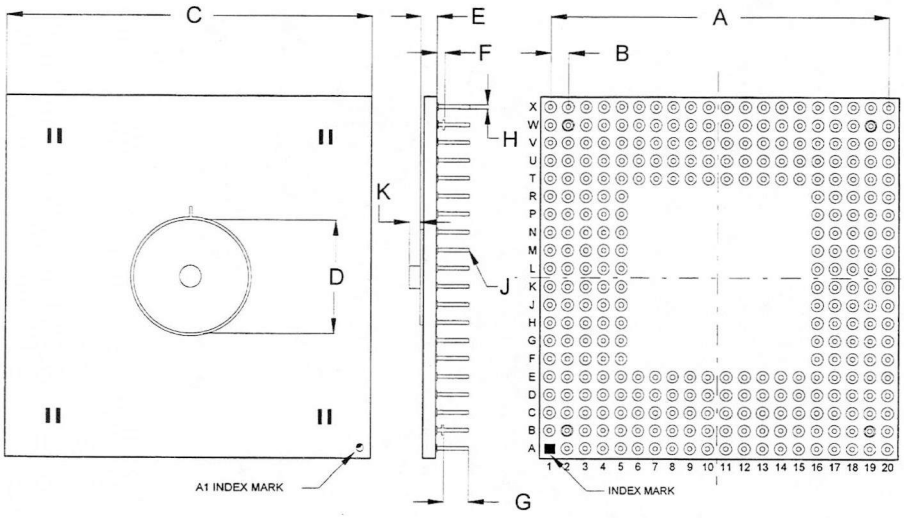
W/B NO.	PIN NO.
209	A16
210	D13
211	B14
212	C13
213	A15
214	C12
215	B13
216	D12
217	A14
218	B12
219	A13
220	C11
221	A12
222	D11
223	A11
224	B11
225	A10
226	B10
227	A9
228	D10
229	A8
230	C10
231	B8
232	B9
233	A7
234	D9

W/B NO.	PIN NO.
235	B7
236	C9
237	A6
238	C8
239	B6
240	D8
241	A5
242	C7
243	B5
244	C6
245	A4
246	D7
247	B4
248	C5
249	A3
250	D6
251	B3
252	C4
253	A2
254	D5
255	B2
256	C3

S/R	NC
D/A	NC
EXTRA E5	PINNC

pga299

299 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	48.26±.30
B	2.54
C	50.80±.30
D	15.00
E	2.70
F	1.27
G	3.31
H	0.46
J	0.12
K	3.5

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

WB NO.	PIN NO.
1	C3
2	E5
3	B3
4	E6
5	C4
6	D6
7	D5
8	E7
9	B4
10	C5
11	B5
12	A5
13	C6
14	B6
15	D7
16	A6
17	C7
18	E8
19	B7
20	D8
21	A7
22	E9
23	C8
24	D9
25	B8
26	C9

WB NO.	PIN NO.
27	A8
28	C10
29	B9
30	E10
31	B10
32	D10
33	B11
34	D11
35	B12
36	E11
37	B13
38	C11
39	A14
40	C12
41	C13
42	D12
43	B14
44	E12
45	A15
46	D13
47	C14
48	E13
49	B15
50	A16
51	C15
52	B16

WB NO.	PIN NO.
53	A17
54	C16
55	B17
56	D16
57	D14
58	C17
59	E14
60	B18
61	D15
62	B19
63	E15
64	D17
65	C18
66	E16
67	C19
68	F16
69	D18
70	F17
71	E17
72	G16
73	D19
74	E18
75	D20
76	E19
77	F18
78	E20

WB NO.	PIN NO.
79	G17
80	F19
81	H16
82	G18
83	H17
84	F20
85	J16
86	G19
87	J17
88	H18
89	J18
90	G20
91	K18
92	H19
93	K16
94	J19
95	K17
96	K19
97	L17
98	L19
99	L16
100	M19
101	L18
102	N20
103	M18
104	N19

WB NO.	PIN NO.
105	M17
106	P20
107	M16
108	N18
109	N17
110	P19
111	N16
112	R20
113	P18
114	R19
115	T20
116	R18
117	T19
118	U20
119	T18
120	U19
121	P17
122	T17
123	P16
124	U18
125	R17
126	V19
127	R16
128	V18
129	U17
130	T16

WB NO.	PIN NO.
131	W19
132	T15
133	W18
134	U15
135	V17
136	T14
137	U16
138	W17
139	V16
140	W16
141	X16
142	V15
143	W15
144	U14
145	T13
146	X15
147	U13
148	V14
149	T12
150	W14
151	U12
152	X14
153	V12
154	V13
155	V11
156	W13

WB NO.	PIN NO.
157	T11
158	X13
159	U11
160	W12
161	U10
162	W11
163	T10
164	W10
165	V10
166	W9
167	V9
168	W8
169	U9
170	X7
171	T9
172	V8
173	U8
174	W7
175	T8
176	X6
177	V7
178	W6
179	X5
180	V6
181	W5
182	X4

WB NO.	PIN NO.
183	V5
184	W4
185	U7
186	U5
187	T7
188	V4
189	U6
190	W3
191	T6
192	V3
193	U4
194	T5
195	W2
196	R5
197	V2
198	R4
199	U3
200	P5
201	T4
202	U2
203	T3
204	U1
205	T2
206	R3
207	T1
208	P4

WB NO.	PIN NO.
209	R2
210	N5
211	P3
212	N4
213	R1
214	M5
215	P2
216	M4
217	N3
218	M3
219	P1
220	L3
221	N2
222	L5
223	M2
224	L4
225	L2
226	K4
227	K2
228	K5
229	J2
230	K3
231	H1
232	J3
233	H2
234	J4

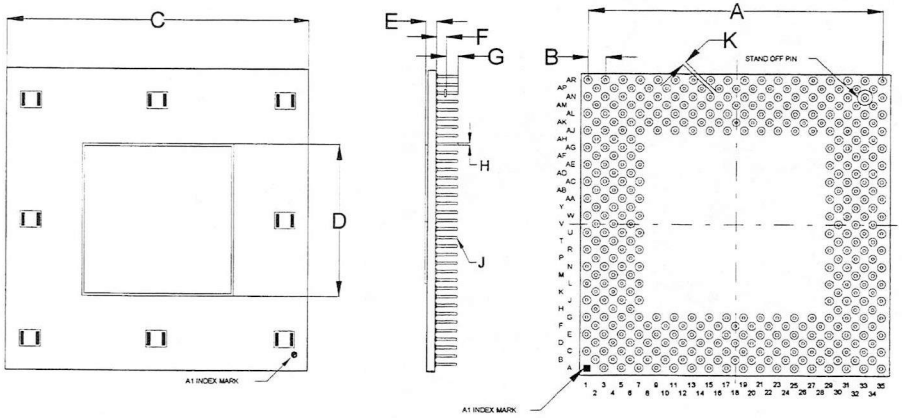
WB NO.	PIN NO.
235	H3
236	J5
237	G1
238	H4
239	G2
240	H5
241	G3
242	F1
243	F2
244	F3
245	E1
246	E2
247	E3
248	G4
249	D2
250	G5
251	D3
252	F4
253	C2
254	E4
255	B2
256	F5
257	D4
VSS	A2
VSS	A4
VDD	C20

WB NO.	PIN NO.
VSS	A12
VSS	A19
VSS	B20
VSS	C1
VSS	H20
VSS	J1
VSS	K20
VSS	L1
VSS	M20
VSS	N1
VSS	V1
VSS	W20
VSS	X1
VSS	X3
VSS	X9
VSS	X11
VSS	X17
VSS	X19
VDD	A3
VDD	A9
VDD	A11
VDD	A13
VDD	A18
VDD	A20
VDD	B1
VDD	C20

WB NO.	PIN NO.
VDD	D1
VDD	J20
VDD	K1
VDD	L20
VDD	M1
VDD	V20
VDD	W1
VDD	X2
VDD	X8
VDD	X10
VDD	X12
VDD	X18
VDD	X20

pga391

391 CERAMIC PIN GRID ARRAY



DIM	CHIP EXPRESS
A	43.18
B	2.54
C	47.24±.4
D	22.86
E	3.175
F	1.778
G	3.048
H	.457
J	.127
K	.254

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.	W/B NO.	PIN NO.
1	F6	27	F14	53	B24	79	E31	105	M32	131	W29	157	AL33	183	AN29
2	B2	28	D14	54	D22	80	F28	106	J33	132	Y32	158	AG31	184	AK24
3	E7	29	G15	55	E21	81	C33	107	N31	133	Y30	159	AK32	185	AN25
4	D4	30	B12	56	B26	82	E29	108	N33	134	AB34	160	AG29	186	AJ23
5	F8	31	E15	57	G21	83	G29	109	P30	135	AA33	161	AM34	187	AP28
6	B4	32	C15	58	C23	84	F30	110	K34	136	AD34	162	AH30	188	AM24
7	G9	33	B14	59	F22	85	G31	111	R29	137	AA31	163	AL31	189	AN27
8	D6	34	D16	60	C27	86	B34	112	P32	138	AB32	164	AJ31	190	AL23
9	E9	35	F16	61	E23	87	H30	113	R31	139	AA29	165	AN33	191	AN23
10	C5	36	B16	62	D24	88	D32	114	M34	140	AF34	166	AJ29	192	AK22
11	F10	37	G17	63	B28	89	J29	115	R33	141	AB30	167	AK30	193	AP26
12	D8	38	E17	64	G23	90	D34	116	P34	142	AC33	168	AL29	194	AJ21
13	B6	39	F18	65	C25	91	J31	117	T30	143	AC31	169	AP34	195	AM22
14	D10	40	A17	66	F24	92	F32	118	T32	144	AG33	170	AK28	196	AL21
15	G11	41	C17	67	C29	93	K30	119	U29	145	AD32	171	AM32	197	AP24
16	C7	42	B18	68	E25	94	E33	120	T34	146	AC29	172	AJ27	198	AN21
17	E11	43	C19	69	D26	95	H32	121	V30	147	AH34	173	AP32	199	AP22
18	C11	44	A19	70	G25	96	F34	122	U31	148	AD30	174	AL27	200	AK20
19	F12	45	E19	71	B30	97	L29	123	U35	149	AE33	175	AM30	201	AM20
20	B8	46	B20	72	D28	98	K32	124	U33	150	AE31	176	AK26	202	AJ19
21	G13	47	D18	73	C31	99	L31	125	V34	151	AJ33	177	AN31	203	AP20
22	D12	48	D20	74	F26	100	G33	126	W33	152	AE29	178	AM28	204	AK18
23	C9	49	G19	75	D30	101	M30	127	W35	153	AF32	179	AP30	205	AL19
24	C13	50	B22	76	E27	102	L33	128	W31	154	AK34	180	AJ25	206	AR19
25	E13	51	F20	77	B32	103	N29	129	V32	155	AH32	181	AM26	207	AN19
26	B10	52	C21	78	G27	104	H34	130	Y34	156	AF30	182	AA25	208	AP18

WIRE BOND PAD / CONNECTOR PIN INTERCONNECTION PLAN

W/B NO.	PIN NO.
209	AN17
210	AR17
211	AM18
212	AL17
213	AJ17
214	AP16
215	AK16
216	AM16
217	AP14
218	AN15
219	AL15
220	AP12
221	AJ15
222	AM14
223	AK14
224	AP10
225	AL13
226	AN13
227	AN9
228	AM12
229	AJ13
230	AP8
231	AK12
232	AN11
233	AL11
234	AN7

W/B NO.	PIN NO.
235	AJ11
236	AM10
237	AP6
238	AM8
239	AK10
240	AN5
241	AL9
242	AM6
243	AJ9
244	AP4
245	AK8
246	AL5
247	AL7
248	AN3
249	AJ7
250	AK6
251	AJ5
252	AP2
253	AH6
254	AM4
255	AG7
256	AM2
257	AG5
258	AK4
259	AF6
260	AL3

W/B NO.	PIN NO.
261	AH4
262	AK2
263	AE7
264	AF4
265	AE5
266	AJ3
267	AD6
268	AE3
269	AC7
270	AH2
271	AD4
272	AG3
273	AC5
274	AC3
275	AB6
276	AF2
277	AA7
278	AB4
279	AA5
280	AD2
281	AA3
282	AB2
283	Y6
284	Y4
285	W7
286	Y2

W/B NO.	PIN NO.
287	V6
288	W5
289	W1
290	W3
291	V2
292	U3
293	U1
294	V4
295	U5
296	U7
297	T2
298	T6
299	T4
300	R5
301	P2
302	R3
303	M2
304	R7
305	P4
306	P6
307	K2
308	N5
309	N3
310	J3
311	M4
312	N7

W/B NO.	PIN NO.
313	H2
314	M6
315	L3
316	L5
317	G3
318	L7
319	K4
320	F2
321	H4
322	K6
323	E3
324	J5
325	F4
326	J7
327	D2
328	H6
329	E5
330	G5
331	C3
332	G7
VSS	A3
VSS	A7
VSS	A11
VSS	A23
VSS	A27
VSS	A31

W/B NO.	PIN NO.
VSS	A35
VSS	E35
VSS	J35
VSS	AE35
VSS	AJ35
VSS	AN35
VSS	AR33
VSS	AR29
VSS	AR25
VSS	AR13
VSS	AR9
VSS	AR5
VSS	AR1
VSS	AL1
VSS	AG1
VSS	L1
VSS	G1
VSS	C1
VSS(CORE)	AC1
VSS(CORE)	R1
VSS(CORE)	A15
VSS(CORE)	AA35
VSS(CORE)	N35
VSS(CORE)	AR21
VDD	A5
VDD	A9

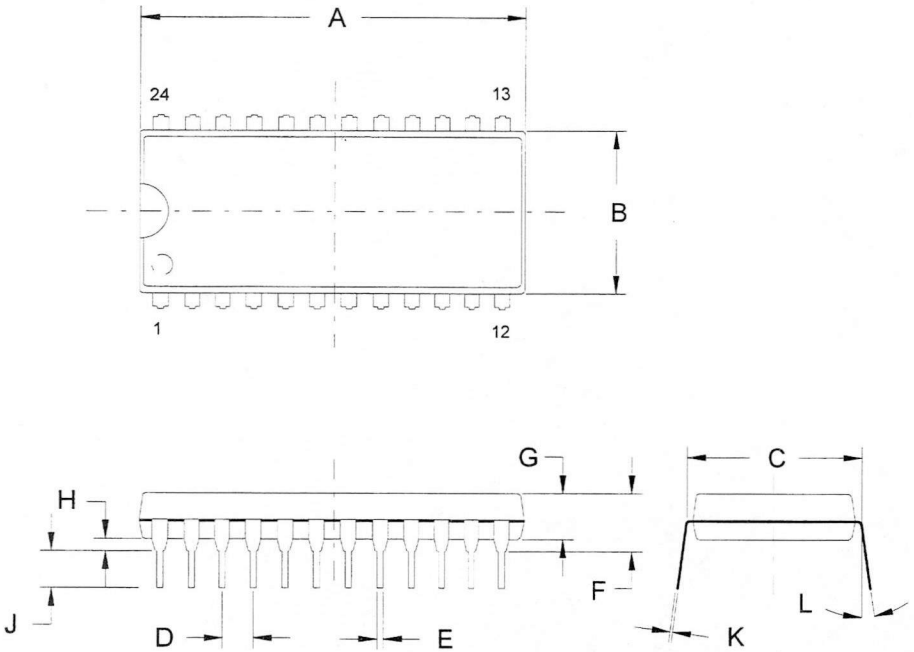
W/B NO.	PIN NO.
VDD	A13
VDD	A25
VDD	A29
VDD	A33
VDD	C35
VDD	G35
VDD	L35
VDD	AG35
VDD	AL35
VDD	AR35
VDD	AR31
VDD	AR27
VDD	AR23
VDD	AR11
VDD	AR7
VDD	AR3
VDD	AN1
VDD	AJ1
VDD	AE1
VDD	J1
VDD	E1
VDD(CORE)	AA1
VDD(CORE)	N1
VDD(CORE)	A21
VDD(CORE)	AC35
VDD(CORE)	R35

W/B NO.	PIN NO.
VDD(CORE)	AR15
D/A	NC
S/R	NC

DIP

dip24

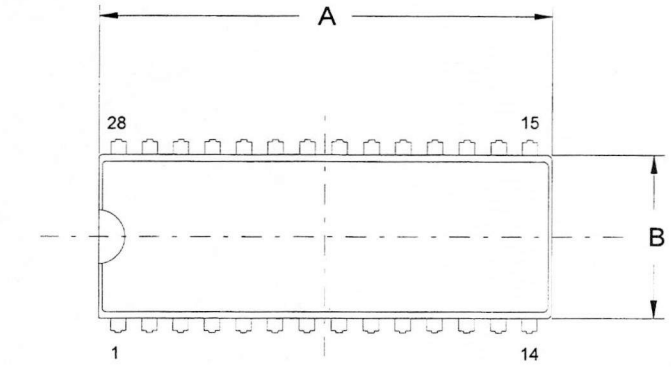
DIP 24

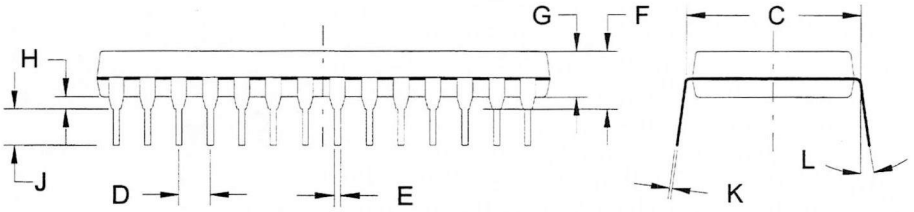


DIM	CERAMIC	YAMAHA	ASE/PTX
A	30.40	31.60 TYP	31.75±.3
B	15.10	13.40 TYP	13.70±.10
C	15.70	15.24 TYP	15.50±.50
D	2.54	P-2.54 TYP	2.54
E	0.50	0.50 TYP	.50
F	3.40	5.70 MAX	4.2
G	2.00	4.60 MAX	3.7
H	1.50	0.50 MIN	.5
J	4.00	2.50 MIN	3.25
K	0.25	0.25±0.10	0.25±0.10
L	0-15°	0-15°	0-15°

dip28

DIP 28

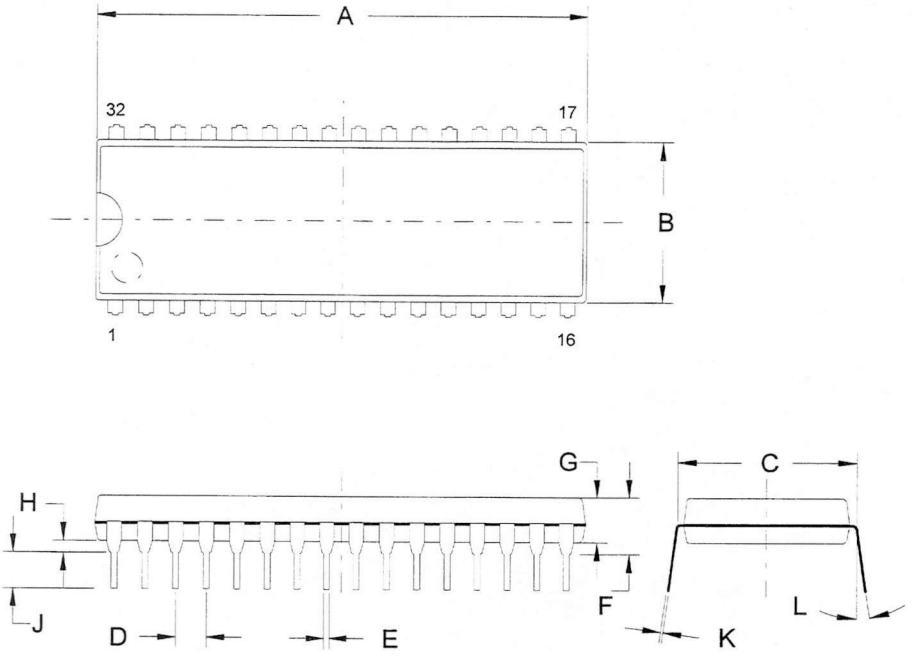




DIM	CERAMIC	YAMAHA	ASE/PTX
A	35.61	36.40 TYP	36.83±.30
B	15.10	13.40 TYP	13.70±.10
C	15.70	15.24 TYP	15.50±.50
D	2.54	P-2.54 TYP	2.54
E	0.50	0.50 TYP	.50
F	3.58	5.70 MAX	4.2
G	2.18	4.60 MAX	3.7
H	1.45	0.50 MIN	.50
J	4.40	2.50 MIN	3.25
K	0.25	0.25±0.10	0.25±0.10
L	0-15°	0-15°	0-15°

dip32

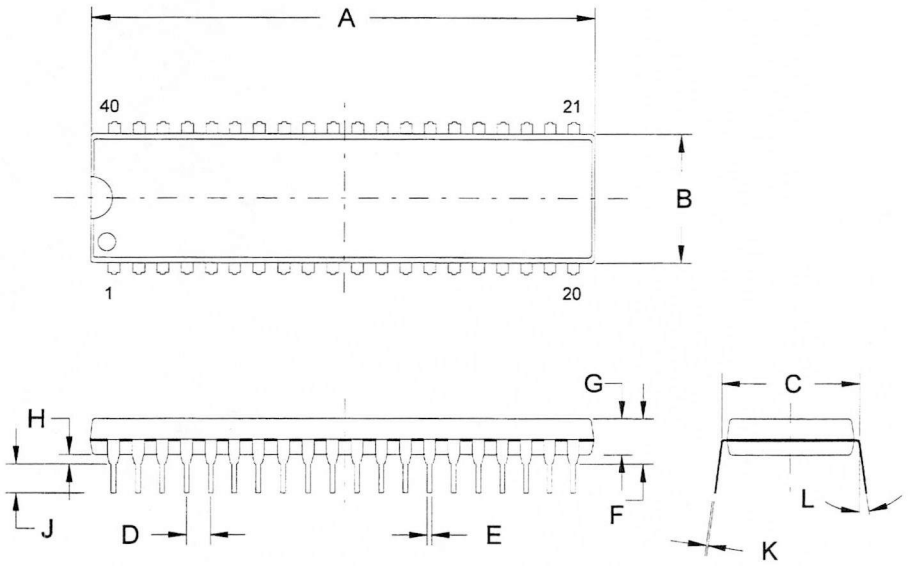
DIP 32



DIM	CERAMIC	YAMAHA	ASE/PTX
A	40.50	41.20 TYP	41.90±.30
B	15.10	13.50 TYP	13.70±.10
C	15.50	15.24 TYP	15.50±.50
D	2.54	P-2.54 TYP	2.54
E	0.50	0.46 TYP	.50
F	3.40	5.06 MAX	4.2
G	2.10		3.7
H	1.50	0.43 TYP	.50
J	4.00	2.54 MIN	3.25
K	0.25	0.25±0.10	0.25±0.10
L	0-15°	0-15°	0-15°

dip40

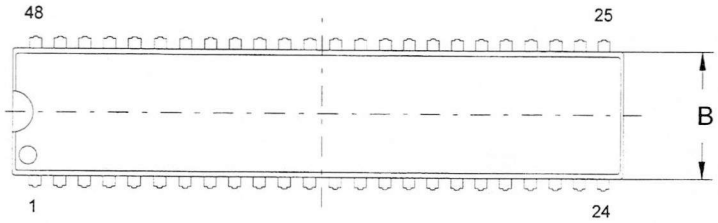
DIP 40

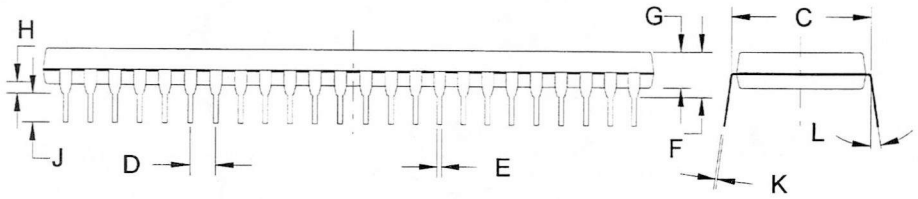


DIM	CERAMIC	YAMAHA	ASE/PTX
A	51.00	52.80 TYP	52.07±.30
B	15.10	13.40 TYP	13.70±.10
C	15.60	15.24 TYP	15.50±.50
D	2.54	P-2.54 TYP	2.54
E	0.45	0.50 TYP	.50
F	3.55	5.08 MAX	4.2
G	2.27		3.7
H	1.50	0.40 MIN	.50
J	4.00	2.54 MIN	3.25
K	0.25	0.25±0.10	0.25±0.10
L	0-15°	0-15°	0-15°

dip44

DIP 44

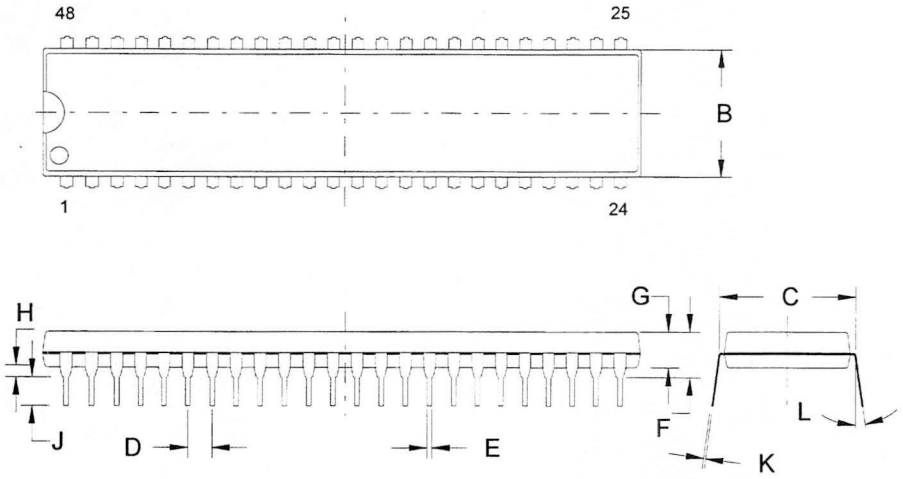




DIM	CERAMIC
A	51.00
B	15.10
C	15.60
D	2.50
E	0.45
F	3.55
G	2.27
H	1.5
J	4.0
K	0.25
L	0-15°

dip48

DIP 48

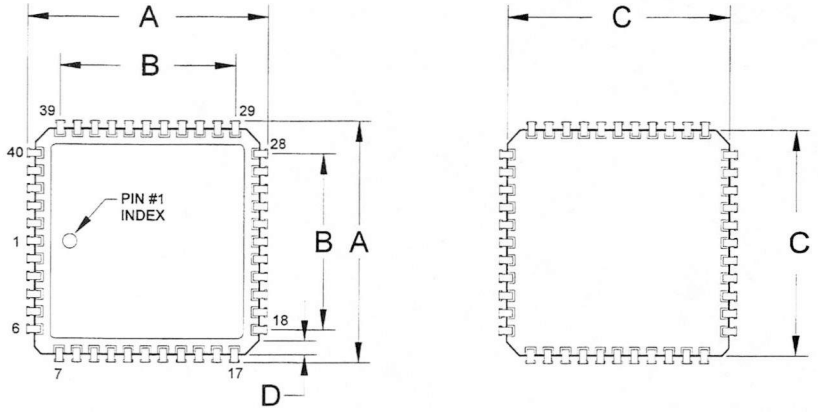


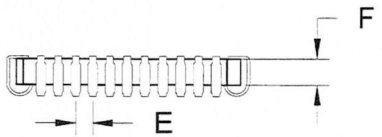
DIM	CERAMIC	ASE/PTX
A	60.96	61.97±.30
B	15.10	13.70±.10
C	15.60	15.50±.50
D	2.50	2.54
E	0.45	.50
F	3.55	4.2
G	2.27	3.7
H	1.50	.50
J	4.00	3.25
K	0.25	0.25±.10
L	0-15°	0°-15°

LDCC

ldcc44

LDCC 44

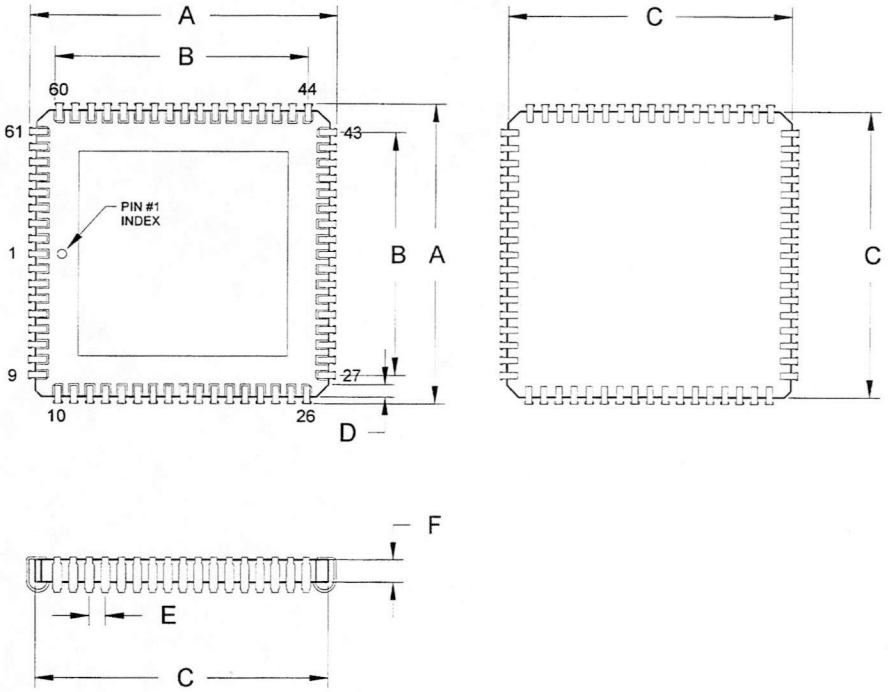




DIM	CERAMIC	PTX
A	17.44	17.53±.127
B	12.90±0.15	12.9&&P.127
C	16.51±0.15	16.6±.127
D	0.50±0.10	1.14
E	1.35±0.05	1.27
F	1.80±0.10	3.68±.05

ldcc68

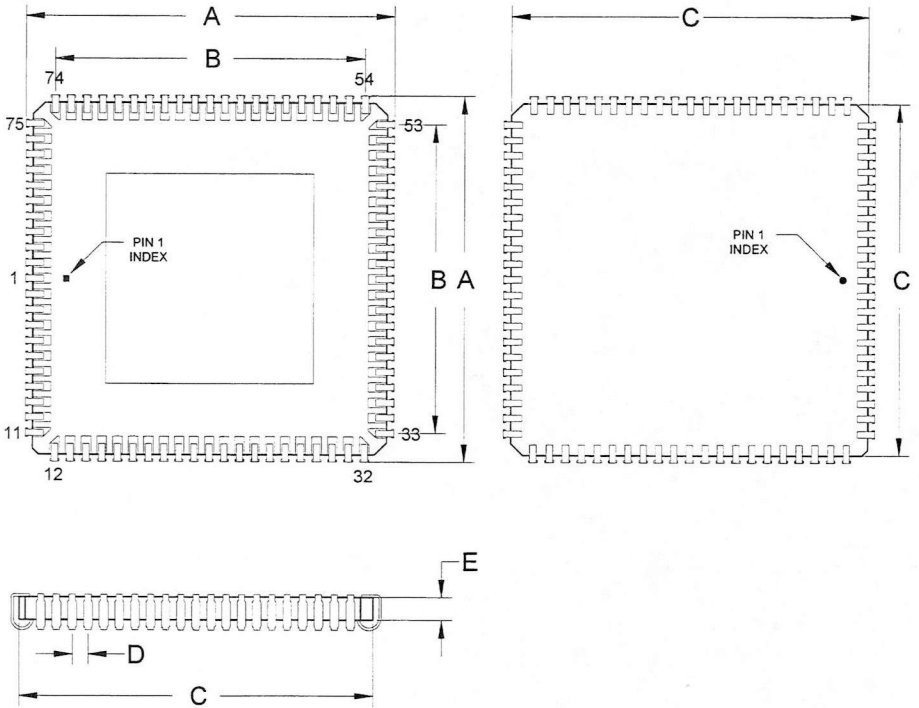
LDCC 68



DIM	CERAMIC	PTX
A	25.15	25.146±.127
B	20.52	20.52
C	24.1	24.2±.127
D	0.50	1.143
E	1.27	1.27
F	2.03	3.68

ldcc84

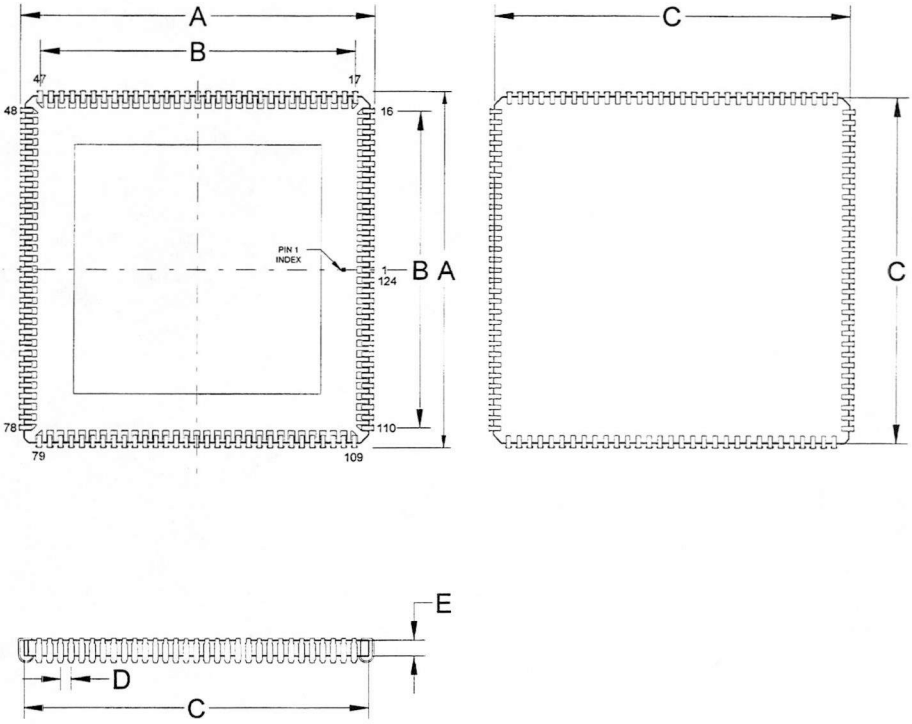
LDCC 84



DIM	CERAMIC	PTX
A	30.28	30.226±.127
B	25.58	25.58±.127
C	29.30	29.268±.127
D	1.27	1.27
E	2.08	3.68

ldcc124

LDCC 124



DIM	CERAMIC
A	42.926±.254
B	38.100±.254
C	41.91±.381
D	1.27
E	2.03

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